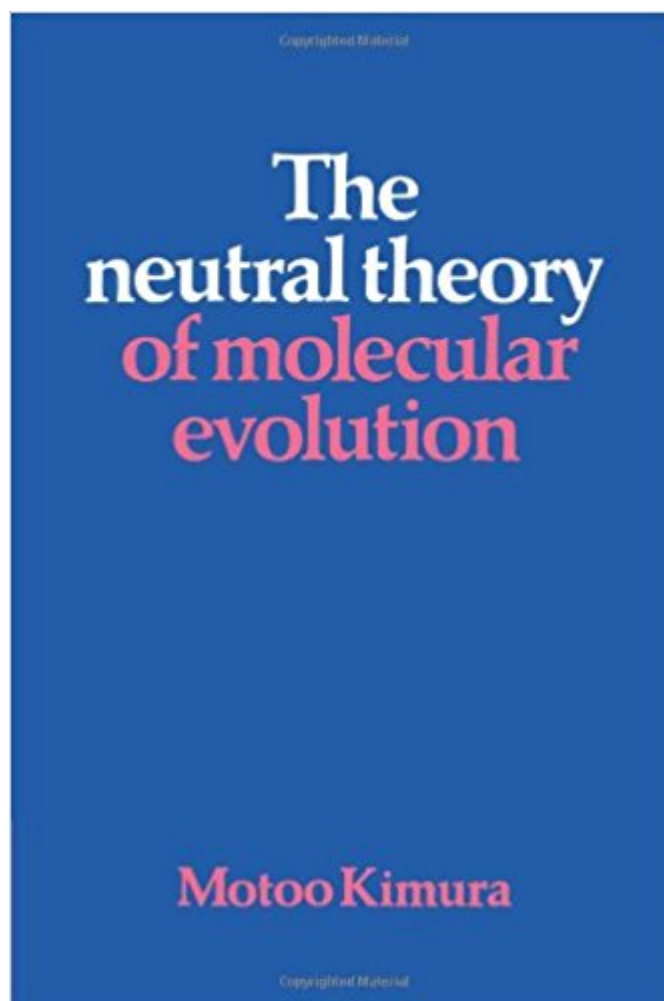


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The Neutral Theory Of Molecular Evolution



Synopsis

Motoo Kimura, as founder of the neutral theory, is uniquely placed to write this book. He first proposed the theory in 1968 to explain the unexpectedly high rate of evolutionary change and very large amount of intraspecific variability at the molecular level that had been uncovered by new techniques in molecular biology. The theory - which asserts that the great majority of evolutionary changes at the molecular level are caused not by Darwinian selection but by random drift of selectively neutral mutants - has caused controversy ever since. This book is the first comprehensive treatment of this subject and the author synthesises a wealth of material - ranging from a historical perspective, through recent molecular discoveries, to sophisticated mathematical arguments - all presented in a most lucid manner.

Book Information

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'... a work of great significance, which should be read by everyone with a serious interest in evolution.' *New Scientist*
'... this book is a major contribution to the field.' *The Times Higher Education Supplement*

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large amount of intraspecific variability at the molecular level that had been uncovered by new techniques in molecular biology.

This book is a classic and anybody who is considering a career in molecular genetics should read this book thoroughly and take time to reflect on its meaning. It is well written and the ideas and exposition are excellent. The theory is now best described as "null hypothesis" that one should now test your (much more easily obtained) genomic data against. Unfortunately, many current geneticists are not formally taught this material.

Kimura's contribution to the area of molecular evolution is unparalleled in this field. This book is a true classic that still has high relevance nowadays and it is continuously cited in the research literature. The mathematical elegance of this theory is breathtaking, and any student contemplating a research life in molecular evolution must read it.

"Natural" mathematics is the idea that mathematical formulations are inherently prone to paradox. Therefore, added to them--although not in an internally consistent manner--must be the idea that mathematical formulations are human perception. This inherently faulty position was taken by mathematicians at the turn of the century in order to avoid the "paradoxes" of Cantorian set theory. However, Garciadiego has shown (in BERTRAND RUSSELL AND THE ORIGINS OF THE SET-THEORETIC 'PARADOXES') that the "paradoxes" of set theory were not paradoxes at all--they were meaningless formulations, or simply labels for concepts which had never existed (such as the Burali-Forti "paradox"). This line of mathematical historical research has exposed the flaws of "natural" mathematics. It is well known that Kimura was deficient in mathematical tools when it came time to express his ideas. So he turned to the mathematics of Malecot. Unfortunately, Malecot's mentor was Emile Borel, one of the first mathematicians to develop "natural" mathematics in response to the set-theoretic "paradoxes." Kimura's neutral theory used to be regarded as the dernier mot in avant garde biological theory. However, it almost certainly is faulty, containing the same flaw as "natural" mathematics. To see how this is so, translate Richard's contradiction (recounted on pp. 141-142 of Garciadiego) into Kimura's theoretical formulation. You will see that it suffers--in its own terms of art--from the flaw Richard saw in his own contradiction (and pointed out in a letter to Poincare). The problem in Richard is that "the collection G had meaning only if the set E was defined in totality; this could not be done except with infinitely many words." It is very likely that Kimura's notion of "population" plays the same role in the neutral theory, that set E plays in

Richard's contradiction, and this identification invalidates the neutral theory. In addition, it is likely that the word "population" is used identically in Darwin, and open to the same objection as set E. This is because "natural" mathematics is an idea with deep historical roots: it has been the response to paradox since ancient times. However, it is almost certainly true that there are no internally consistent paradoxes; they are simply meaningless formulations. Thus, this book has historical interest, but no internal consistency.

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